

Docket No.: 12810-00095-US
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Martin Haubner et al.

Application No.: 10/537,962

Confirmation No.: 1386

Filed: June 9, 2005

Art Unit: 1614

For: METHOD FOR THE PRODUCTION OF
TETRAHYDROFURAN COPOLYMERS

Examiner: Katakam, Sudhakar

REPLY BRIEF

MS Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

This Reply Brief is a response, filed within two months, to the Examiner's Answer dated February 26, 2008 pursuant to 37 CFR §41.41.

Arguments begin on page 2 of this paper.

ARGUMENTS

Claims 1-11 were rejected as obvious and therefore unpatentable under 35 U.S.C. § 103(a) over EP 1 361 243 A1 to Kodama et al. (“Kodama”) in view of U.S. Patent No. 5,395,959 to Weyer et al. (“Weyer”). These references, when read in their entirety, fail to support the Examiner’s position that claims 1-11 are obvious in view of their combination. In particular, Appellant respectfully submits the Examiner’s Answer has: (1) ignored subject matter specifically recited in the claims; and (2) mischaracterized the subject matter described in the references.

I. THE REFERENCES DO NOT DESCRIBE ALL OF THE COMPONENTS/PROCESS STEPS IN THE MANNER PRESENTLY CLAIMED

The Examiner contends in the Examiner’s Answer that:

Kodama et al. clearly teach a copolymerization reaction in which an inorganic acid catalyst (preferably a heteropolyacid catalyst), THF and a diol (as raw material monomers) and a reaction terminator are used in the reaction.

Examiner’s Answer at page 7, lines 9-12. (Emphasis added).

By contrast, Appellants point out that appealed claim 1 recites, *inter alia*, “copolymerizing, in one stage, tetrahydrofuran and alpha, omega-diols with the exception of butanediol as the comonomer in the presence [of] a heteropolyacid and of a hydrocarbon” and then separately “distilling off a mixture of water and the hydrocarbon from the copolymerization.” (Emphasis added). See page 4, lines 4-19 of the present specification which describes the hydrocarbons useful in the single stage process step, and notes that the hydrocarbon is specifically added at the beginning of the reaction.

Kodama, on the other hand, in one embodiment recites “subjecting [THF] and neopentyl glycol to a copolymerization reaction in the presence of a heteropolyacid catalyst, while *continuously* removing from the reaction system water.” Paragraph [0011] of Kodama. (Emphasis added). In other embodiments, the reference merely indicates, *inter alia*, a method that uses a hydrocarbon, which is added to the organic phase to thereby precipitate the catalyst; and a method in which the hydrocarbon is distilled off and *recycled* in the reaction. *Id.* at paragraphs [0094] and [0095]. See also paragraph [0066] indicating the addition of the

hydrocarbon, *in a separate step*, to remove the catalyst, which is clearly in contrast to the above-recited process steps of appealed claim 1.

Regarding Weyer, Appellant notes that references describes the “possible” use of organic solvents. However, the reference clearly recites that “[a]s a rule, the monomer serves both as a reactant and as a solvent.” Column 10, lines 13-14 of Weyer. (Emphasis added). Further, regarding the phases/stages of the reaction, Weyer clearly indicates that the polymerization reaction occurs in “ 2-phase system essentially consisting of [a] monomer- and product-containing upper phase and [a]catalyst phase.” As such, there is no indication or motivation, based on the disclosures, to employ *all* of the components of appealed claim 1 in a *single stage process step* followed by the separate distillation step in the course of the reaction.

II. THE PROCESS STEPS OF KODAMA AND WEYER ARE ENTIRELY DIFFERENT FROM THE APPEALED CLAIMS

The Examiner contends that “Kodama et al. teach that a specific example of a reaction terminator, used to terminate the copolymerization reaction, is water [see 0079 in page 16].” Examiner’s Answer at page 7, lines 12-14.

However, Appellant submits that there are several recitations throughout Kodama that are in contrast to the Examiner’s suggestion that the mere indication of water makes the third step of appealed claim 1 obvious. In particular, the reference indicates that “water *and* a diol” are reaction terminators, without any description of the third step of appealed claim 1. In addition, the reference recites, *inter alia*, that:

- 1) “*water and THF are azeotropically distilled off* from the reaction system and THF is returned to the reaction mixture” (paragraphs [0053] and [0084]);
- 2) “*the water/THF vapor is continuously withdrawn* from the reaction system while simultaneously and continuously feeding *THF containing only a small amount of water* to the reaction system” (paragraph [0053]); and
- 3) “[f]or removing water while maintaining the stable polymerization reaction conditions, it is preferred that the reaction system is separated into the organic phase and the catalyst phase and, *then, the azeotropic mixture of water and THF is withdrawn from the organic phase.*” (paragraph [0087]).

As such, there is clearly no indication of “distilling off a mixture of water and the hydrocarbon from the copolymerization,” and then “terminating the polymerization by adding water,” as recited in appealed claim 1.

Regarding Weyer, the Examiner contends that:

Weyer et al. also teach a method for the heteropolyacid catalyzed polymerization of monomeric reactants to produce a polyoxyalkylene glycol in presence of [a] proton donor or water [see col. 13, lines 4-10 & col. 14, lines 4-6].

Examiner’s Answer at page 7, lines 14-16. (Emphasis in original). The Examiner further contends that

Weyer et al. also clearly teach that the complete addition of the proton donor R-H, wherein R is a hydroxyl group, at the polyoxyalkylene chain being formed causes chain termination in the polymerization reaction [see col. 1, lines 66-68 & col. 2, lines 32-35].

Examiner’s Answer at page 7, lines 16-19. (Emphasis added).

However, the Examiner’s selective characterization of Weyer does not reflect the reference’s disclosure as a whole. For instance, column 1, lines 66-68 of Weyer refers to a discussion of previous reaction systems that the disclosure has overcome. In particular, the reference recites that the object of the disclosure is to *regulate* the proton donor in the reaction system, since there was previously “no method for continuously measuring and controlling . . . the proton donor R-H in the catalyst phase over the course of the reaction.” *Id.* at column 3, lines 4-8. Therefore, the reference clearly does not cure the deficiencies of Weyer, since *measuring and controlling water over the course of the reaction* is not the process of the appealed claim 1.

In view of the above reasons explaining the patentable distinctness of the presently appealed claims and the previously discussed evidence of record, it is abundantly clear that the Examiner has erred in the rejection of claims 1-11 under 35 U.S.C. § 103(a). Accordingly, it is respectfully requested that the Board reverse the Examiner and allow claims 1-11.

Appellant believes no fee is due with the filing of this Reply Brief. However, if a fee is due, please charge our Deposit Account No. 22-0185, under Order No. 12810-00095-US from which the undersigned is authorized to draw.

Dated: April 28, 2008

Respectfully submitted,

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